PIPADOR REVISION

# MRCOG Part 1 Revision Notes

## *Prenatal Diagnostic Techniques*

GENETICS • LECTURE 86

VISUAL EXAMINATION REVISION NOTES

*2026 Edition*

MRCOG Part 1 Revision Notes

# Lecture 86: Prenatal Diagnostic Techniques

*Genetics • Visual revision edition — final genetics lecture*

COLOUR CODE USED THROUGHOUT THESE NOTES

| CVS / PLACENTA | AMNIOCENTESIS | LAB TESTS | ARRAY / PGT | FAMILY / COUNSELLING |
|---|---|---|---|---|

**LEARNING OBJECTIVES — tick off as you go**

- ☐ Know the indications for prenatal diagnosis.
- ☐ Compare CVS, amniocentesis and fetal blood sampling — timing, risks, pitfalls.
- ☐ Choose the right lab test: QF-PCR, karyotype, FISH, microarray, exome.
- ☐ Explain mosaicism, PGT (M, SR, A) and non-invasive diagnosis (NIPD).
- ☐ Counsel, give anti-D correctly, and know the law on termination for fetal anomaly.

## 1 Indications

**IN ONE LINE:** *Diagnosis gives an answer: after a higher-chance screen, a structural anomaly, a known family variant or translocation, or a previous affected pregnancy.*

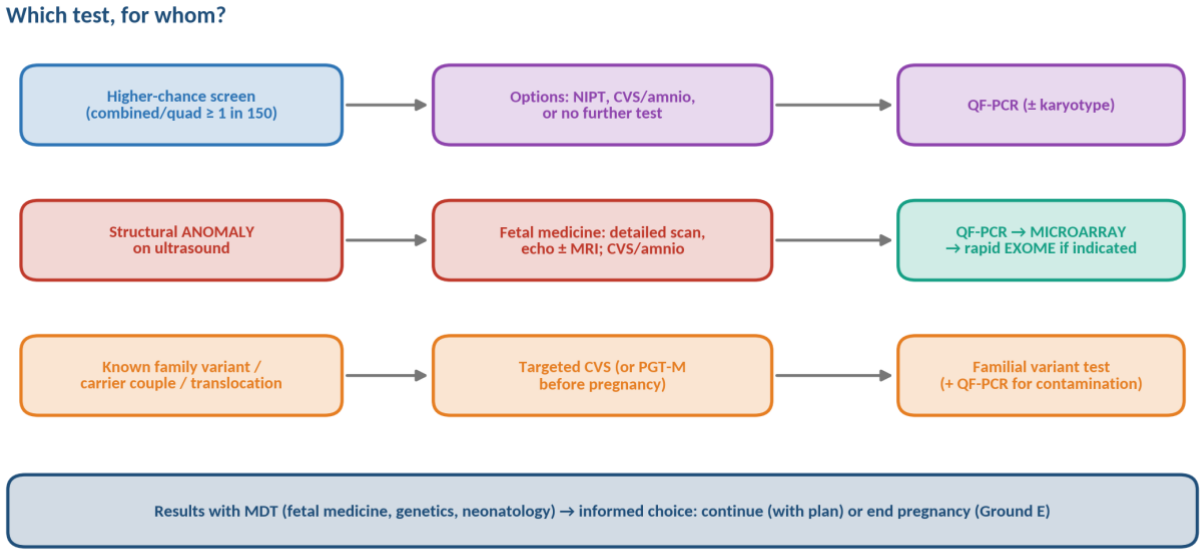



*Figure 1. Which test, for whom.*

## 2 Invasive Procedures

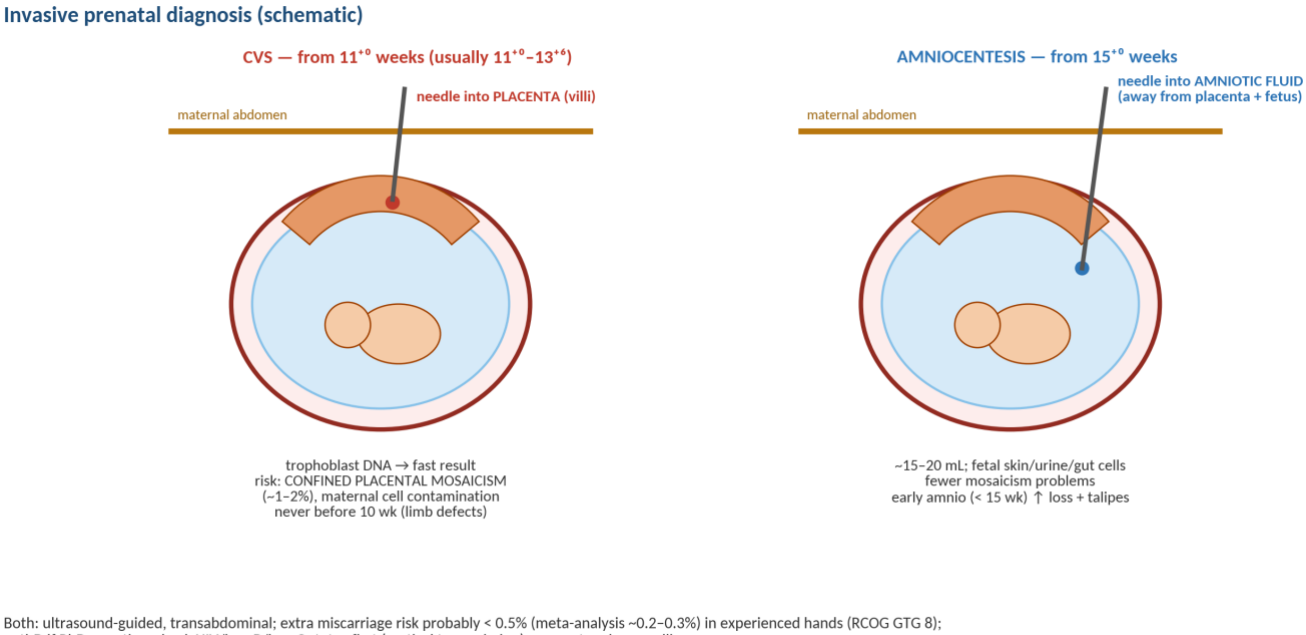



*Figure 2. CVS and amniocentesis.*

| Feature | CVS | Amniocentesis |
|---|---|---|
| **Timing** | From $11^{+0}$ weeks (usually to $13^{+6}$) | From $15^{+0}$ weeks |
| **Sample** | Chorionic villi (placenta) | Amniotic fluid (fetal cells) |
| **Extra miscarriage risk** | Probably < 0.5% (~0.2%) | Probably < 0.5% (~0.1–0.3%) |
| **Pitfalls** | CPM ~1–2%; maternal cell contamination | Slower culture; leak, infection (rare) |
| **Twins** | Higher loss; need careful sac mapping | Higher loss; sample each sac |

- **Fetal blood sampling (cordocentesis)**: from ~18–20 weeks; loss ~1–2%; now mainly for **fetal anaemia** (red-cell antibodies, parvovirus — suspected by raised MCA peak systolic velocity) and **intrauterine transfusion**.

# 3 Laboratory Tests

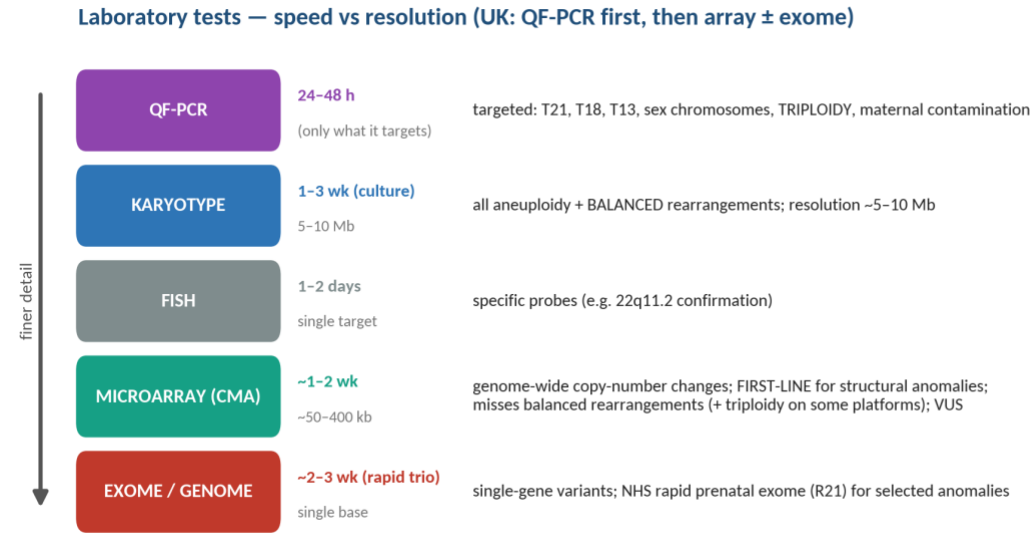



*Figure 3. Speed vs resolution.*

**MNEMONIC / MEMORY HOOK**

**'Quick, Wide, Deep'** — QF-PCR is QUICK (common trisomies), microarray is WIDE (genome-wide copy number), exome is DEEP (single genes).

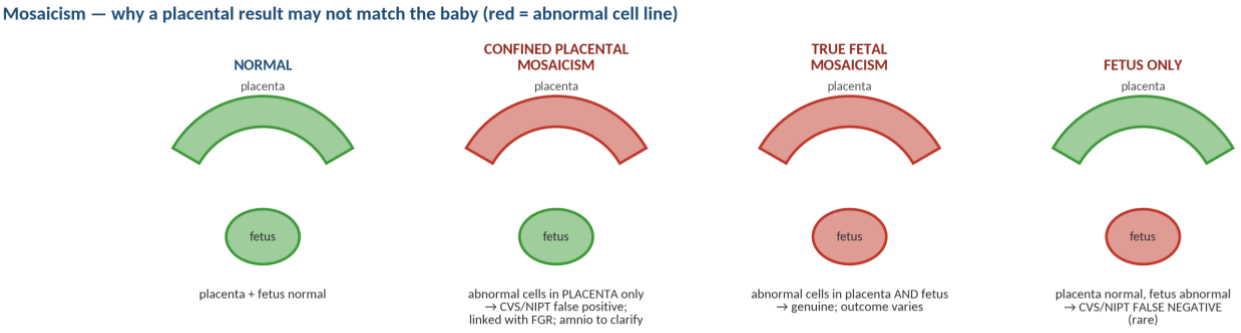



*Figure 4. Mosaicism.*

## 4 PGT and Non-Invasive Diagnosis

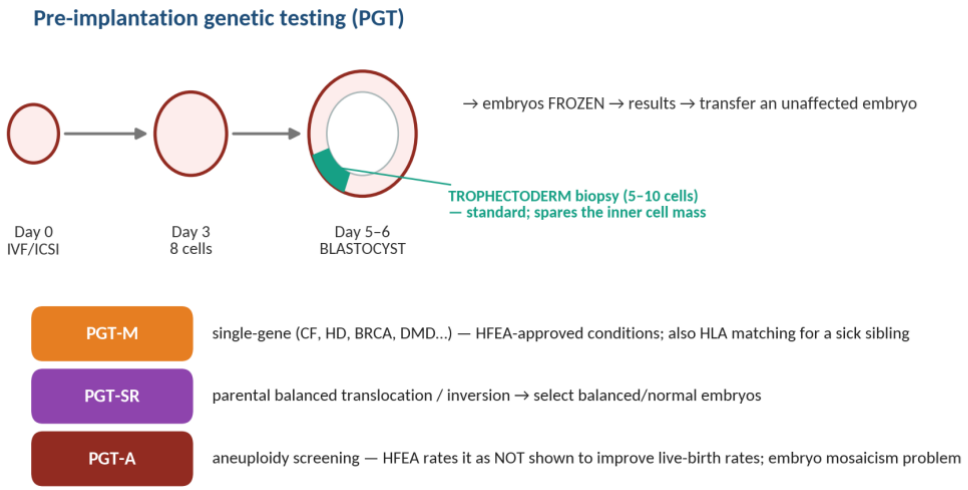



*Figure 5. PGT.*

| Cell-free DNA test | Use |
|---|---|
| **Fetal RhD genotyping** | NHS (NICE DG25): RhD-negative women — give antenatal anti-D only if the baby is RhD-positive |
| **Fetal sex** | X-linked disease (invasive test for boys only); CAH (historically for antenatal steroids) |
| **NIPD for single genes** | Paternal or new variants (e.g. FGFR3 achondroplasia/thanatophoric); some recessive conditions in specialist labs |

## 5 Counselling, Anti-D and the Law

### BEFORE THE PROCEDURE

- Why, what it can/can't find (incl. VUS, incidental findings), risks, timing of results
- Check **HIV / hepatitis B / C** status (transmission risk)
- Written information; time to decide; non-directive
- Results in person; MDT for complex findings; bereavement support

### ANTI-D (RhD-negative, not sensitised)

- Within **72 hours** of the procedure
- **< 20 weeks: 250 IU**
- **≥ 20 weeks: 500 IU + Kleihauer** (more if the bleed is larger)
- Not needed if fetal RhD-negative on cfDNA

### TERMINATION FOR FETAL ANOMALY (GB)

- Abortion Act 1967 (amended 1990) — **Ground E**: substantial risk of serious physical/mental abnormality
- **No upper gestational limit**; two doctors in good faith
- From **22 weeks**: feticide (e.g. intracardiac KCl) before induction (RCOG)
- Northern Ireland has separate (2020) regulations

### METHODS

- Medical: mifepristone then misoprostol (any gestation)
- Surgical: vacuum aspiration (early) or D&E (skilled operators)
- Offer post-mortem/genetic testing — informs recurrence risk
- Follow-up with results and future-pregnancy plan

★ PEARL

**CVS $11^{+0}$–$13^{+6}$, amnio ≥ $15^{+0}$; extra miscarriage risk probably < 0.5% for both.** Abnormal CVS with normal scan → think CPM → amniocentesis.

**Structural anomaly → QF-PCR then microarray (then rapid exome if indicated).** Array misses balanced rearrangements.

## 6 MRCOG Exam Pearls — Last-Minute Page

**Numbers to know**

| | | | |
|---|---|---|---|
| **$11^{+0}$**<br>CVS from | **$15^{+0}$**<br>Amnio from | **< 0.5%**<br>Extra loss risk | **~1–2%**<br>CPM at CVS |
| **24–48 h**<br>QF-PCR result | **~5–10 Mb**<br>Karyotype resolution | **250 / 500 IU**<br>Anti-D < / ≥ 20 wk | **≥ 22 wk**<br>Feticide before TOP |

**HIGH-YIELD CHECKLIST**

- ☐ Indications: higher-chance screen, anomaly, family variant/translocation, previous affected.
- ☐ CVS ≥ $11^{+0}$ (placenta; CPM); amnio ≥ $15^{+0}$ (fluid); loss < 0.5%.
- ☐ FBS: anaemia, transfusion; ~1–2% loss.
- ☐ QF-PCR 24–48 h; karyotype ~5–10 Mb + balanced; array ~50–400 kb (misses balanced); exome single genes.
- ☐ CPM → false positive; fetus-only mosaicism → false negative.
- ☐ PGT-M / SR / A (A not proven to help live birth).
- ☐ cfDNA: fetal RhD, fetal sex, NIPD (FGFR3).
- ☐ BBV status before invasive tests.
- ☐ Anti-D 250 IU < 20 wk; 500 IU + Kleihauer ≥ 20 wk; within 72 h.
- ☐ Ground E — no time limit; feticide from 22 wk.

**Self-assessment** — cover the right-hand column

| Question | Answer |
|---|---|
| **Earliest gestation for CVS?** | $11^{+0}$ weeks |
| **Why avoid amniocentesis before 15 weeks?** | Higher loss and talipes |
| **Abnormal CVS, normal scan — likely explanation?** | Confined placental mosaicism → offer amniocentesis |
| **First-line genome-wide test for a structural anomaly?** | Chromosomal microarray (after QF-PCR) |
| **What can microarray NOT detect?** | Balanced rearrangements (and triploidy on some platforms) |
| **Test for a known single-gene variant in embryos?** | PGT-M |
| **Use of fetal RhD cfDNA?** | Target antenatal anti-D to women carrying RhD-positive babies |
| **Anti-D dose after amniocentesis at 16 weeks?** | 250 IU within 72 hours |
| **Legal ground for TOP for fetal anomaly?** | Ground E — no upper time limit |

| Question | Answer |
|---|---|
| **What precedes late TOP for fetal anomaly?** | Feticide (from 22 weeks) |

## 7 References


- RCOG Green-top Guideline No. 8. Amniocentesis and Chorionic Villus Sampling. 2021.
- RCOG. Termination of Pregnancy for Fetal Abnormality in England, Scotland and Wales. 2010.
- BSH guideline. Anti-D immunoglobulin for prevention of HDFN. 2014 (updated); NICE DG25 (fetal RhD genotyping). 2016.